Including examiner comments

R3104

UNDERSTANDING APPLIED PLANT PROPAGATION

Level 3

Wednesday 21 June 2023

15:55 – 16:45

Written Examination

Candidate Number: .....

Candidate Name: .....

Centre Name: .....

IMPORTANT – Please read carefully before commencing:

i) The duration of this paper is **50** minutes;
ii) **ALL** questions should be attempted;
iii) **EACH** question carries **10 marks**;
iv) Write your answers legibly in the spaces provided. It is **NOT** necessary that all lined space is used in answering the questions;
v) Use **METRIC** measurements only;
vi) Use black or blue ink only. Pencil can be used for drawing purposes only. Ensure that all diagrams are labelled accurately with the line touching the named object;
vii) Where plant names are required, they should include genus, species and where appropriate, cultivar;
viii) Where a question requires a specific number of answers; only the first answers given that meet the question requirement will be accepted, regardless of the number of answers offered;
ix) Please note, when the word **'distinct'** is used within a question, it means that the items have different characteristics or features.

Ofqual Unit Code J/505/8534

ANSWER ALL QUESTIONS

MARKS

Q1 Describe the propagation of **NAMED** bush rose, grown open ground, using the T-budding technique under **EACH** of the following headings:

i) the selection of suitable rootstocks 2
ii) propagation method 5
iii) propagule aftercare 2

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Named bush rose 1

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Please see over/…..

MARKS

Total Mark

Please turn over/…..

MARKS

Q2 a) State **FOUR** reasons for seed scarification. **4**

b) Describe **TWO** distinct methods used to scarify seeds giving a **NAMED** plant example for **EACH** method. **6**

Please see over/…..

MARKS

Please turn over/…..

Total Mark

MARKS

Q3 a) Describe **FOUR** routine maintenance tasks for stock plants used to produce stem cuttings. **8**

Please see over/…..

MARKS

b) State **TWO** reasons for using stock plants to produce material for stem cuttings. **2**

Total Mark

Please turn over/…..

MARKS

Q4 a) Describe how a heated propagator functions to provide an ideal environment for leafy softwood cuttings from a **NAMED** plant. **4**

Named plant .....

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MARKS

b) Explain how the environment provided in the propagator aids rooting of these cuttings. **6**

Total Mark

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DO NOT USE THIS PAGE

R3104

UNDERSTANDING APPLIED PLANT PROPAGATION

Level 3

Wednesday 21 June 2023

Candidates Registered	**77**		**Total Candidates Passed**	56	88%
Candidates Entered	64	83%	Passed with Commendation	23	36%
Candidates Absent/Withdrawn	8	10%	Passed	33	52%
Candidates Deferred	5	7%	Failed	8	12%

General comments

Where a plant example is chosen, it is important to write the FULL botanic name and not just a partial name, following the correct naming protocols. Where named plant examples are required, common names are not credited at Level 3.

Spellings of scientific terms and botanic plant names need to be full and accurate - poor spellings may be penalized.

Questions - It is essential to read the question carefully and to note the **key words** before starting to write to ensure answers are relevant. Candidates should take account of the command statements in the question e.g. 'list', 'describe', 'explain', together with the mark allocation, to judge the depth of the answer required. Extra information, even if it is accurate, does not gain extra marks.

Where a number of answers were specified in the question and a candidate gave a list with more than that number, **only the first answers** in the list were marked, e.g. where the question stated 'Name **TWO** locations' or 'State **TWO** ways' only the first **TWO** answers were marked even if the correct answers were given further down. It is helpful (but not essential) if the answers are numbered in the text or separate paragraphs or bullet points are used.

Plant names - Where named plant examples were asked for, **full botanical names are required** to achieve full marks: genus, species and where appropriate variety, cultivar etc. needed to be written and spelt correctly. Where genus alone was given, all species in that genus need to show the characteristic asked for to gain any credit. **Common names were NOT accepted** and misspellings were penalised. Candidates needed to use unambiguous plant examples from sources such as the RHS Plant Finder and/or the RHS A-Z Encyclopaedia of Plants together with examples given in the syllabus and avoid obscure or difficult to verify plant examples, which risked being not credited.

Labels on diagrams must be carefully and correctly positioned to avoid ambiguity. Marks can be easily lost if this is not followed. Labels must actually touch the appropriate part of the diagram and must not be left hanging in mid air. Annotations on diagrams can be accepted as an alternative to description in the text as long as these are clear and answer the question. No marks were awarded for artistic merit or for unlabelled diagrams.

Continuation sheets - Where these have been included, it is vital that the relevant question number is included in the left hand margin if information written here is to be considered. These should also be attached to the answer booklet in the appropriate place and candidates should indicate in their answer booklet that they have written part of their answer on the attached sheet/s.

Q1 Describe the propagation of **NAMED** bush rose, grown open ground, using the T-budding technique under **EACH** of the following headings:

i) the selection of suitable rootstocks
ii) propagation method
iii) propagule aftercare

Named bush rose .....

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Q1

Candidates who named a suitable bush rose e.g., *Rosa* 'Alec's Red', *Rosa* 'Chinatown', *Rosa* 'Queen Elizabeth' were awarded full marks.

i) the selection of suitable rootstocks

The majority of candidates were able to describe a suitable namedrootstock for use when 'T' budding a rose and gained full marks. *Rosa laxa, Rosa rugosa,* or *Rosa canina* should be of a uniform size, graded, true to type and have resistance to pests and diseases.

ii) propagation method

To achieve maximum marks, it was essential that candidates provided detailed descriptions of 'T' budding. This should include preparation of the rootstock i.e., appropriate 'T' shaped cuts made into the collar of the rootstock. Suitable buds should be removed from the middle section of the bud stick by cutting 6mm under a bud, leaving some petiole on cut bud, and then pulling it away with a tail. The wood should be removed from behind the bud which is then slid under the flaps of the cuts made on the rootstock ensuring some cambial contact. The tail is then trimmed. The bud is covered, either with the use of a bud patch or clear grafting tape.

Candidates who described chip budding could not be awarded any marks.

iii) propagule aftercare

Candidates who provided detailed answers with descriptions that included the removal of the budding tape, cutting back of the rootstock just above the bud, the need for irrigation, weed and pest and disease control were awarded maximum marks.
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Q2 a) State **FOUR** reasons for seed scarification.

b)

Describe **TWO** distinct methods used to scarify seeds giving a **NAMED** plant example for **EACH** method.

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Q2 a) Most candidates had a good knowledge of the reasons for seed scarification. Suitable answers which achieved full marks included:

- to enable access of water
- to enable access of air
- to enable emergence of radicle and plumule
- to enable inhibitors to be washed out
- to encourage uniform and quicker germination

b)

Suitable methods that can be used to scarify seeds were understood by most candidates, but answers needed to be detailed to gain full marks. The methods described were:

Nicking

This is usually carried out on large seeds which can be held with an eraser. A small section of the testa is chipped away using a sharp knife without damaging the embryo. e.g., *Lathyrus odoratus.*

Abrasion

Seeds can be placed in a small wooden box containing fine grit or sand and rotated. Alternatively, a small roller can be covered in sand paper and rolled over the seeds to reduce the thickness of the testa. e.g., *Laburnum x watereri* 'Vossii'.

Hot Water Treatment

3-10 volumes of boiling/hot water are poured over 1 volume of seeds. The seeds and water are left to cool for 18-24 hours to enable the seed coat to soften. e.g., *Laburnum anagyroides.*

Acid Digestion

Seeds are placed in a glass container and concentrated sulphuric acid is poured over the seed at a ratio of one part seed to two parts acid. The seeds are carefully stirred periodically. The duration of the treatment is dependent on the species of seed. e.g., *Rosa canina.*

Candidates who provided descriptions of more than the two methods asked for could only receive marks for the first two methods. Describing more methods than were required was a poor use of their time.

Unfortunately some candidates confused stratification with scarification.
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Q3 a) Describe **FOUR** routine maintenance tasks for stock plants used to produce stem cuttings.

b) State **TWO** reasons for using stock plants to produce material for stem cuttings.

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Q3 a) A range of routine maintenance tasks for stock plants were described in detail by the best candidates who were awarded full marks for four tasks.

These included:

Pest and Disease Control

Details included the type of control e.g., cultural, physical, biological or chemical with named examples of products, where applicable for specific pests or diseases.

Weed Control

Details included suitable methods of control e.g., manual weeding using a hoe, mulching using bark chips or leaf mould applied to a depth of 75-100mm or chemical control using a herbicide e.g., Pelargonic acid for perennial weeds.

Pruning

Details included the removal of atypical growth, pruning at the appropriate time of year to maintain juvenility and to ensure the availability of suitable flushes of growth to provide propagation material for cuttings.

Watering

This can be carried out manually with the use of a watering can and a fine rose or a hose and a lance. Overhead irrigation systems with sprinklers arealso available. Alternatively, semi-automatic systems e.g., seep hose or leaky pipe or fully automatic drip irrigation systems can be used.

Details of appropriate feeding or fertiliser application were also credited.

b) The majority of candidates were able to state two appropriate reasons for using stock plants to produce material for stem cuttings and gained maximum marks. Suitable answers included:

- free from pests and diseases
- large number of cuttings produced
- the cutting production schedule can be programmed
- uniformity of cuttings
- production of succession of flushes of cuttings
- production of juvenile cutting material which has greater rooting potential
- true to type
- clonal

Candidates who stated more than two reasons could only be awarded marks for the first two reasons, if correct.
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Q4 a) Describe how a heated propagator functions to provide an ideal environment for leafy softwood cuttings from a **NAMED** plant.

b) Explain how the environment provided in the propagator aids rooting of these cuttings.

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Q4 a)

Candidates who had a good understanding of how a heated propagator functions were awarded full marks. Suitable named plants propagated by softwood cuttings included: *Fuchsia magellanica*, *Syringa vulgaris, Penstemon* 'Hidcote Pink'.

A heated propagator is an enclosed environment with a clear or opaque cover.

It contains a water source or there is controlled addition of water and provides high ambient humidity to maintain turgidity of the cuttings and heating cables to provide basal heat at 18-21ºC to increase respiration. This is controlled by the presence of an electronic thermostat positioned at the same level as the base of the cuttings. Atmospheric temperature is controlled by decreased light levels if the cover is opaque, and ventilation from slats in the cover or by literally lifting the cover.

b) Candidates who had a good knowledge of how the environment provided in a propagator aids rooting achieved maximum marks. Suitable explanations included:

- temperature control of growing media for root initiation and development
- basal heat encourages faster respiration, callus formation and subsequently root initiation
- cooler air temperatures, 15ºC to reduce transpiration stress
- high ambient atmospheric humidity maintains turgidity of tissues and reduces transpiration
- atmospheric temperature control enables photosynthesis and respiration physiology for propagules to root
- opaque cover for temperature control through reduced light levels to reduce stress on propagules

Candidates were credited for their knowledge of how the environment within the propagator affected the physiology of the cuttings, and the optimum conditions required to obtain successful rooting.

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